CLAIMS

1. A method for measuring a metal film thickness, comprising:

heating a region of interest of a metal film with a defined amount of heat energy;

measuring a temperature of the metal film; and

calculating a thickness of the metal film based upon the temperature and the defined amount of heat energy.

2. The method of claim 1, wherein the method operation of heating a region of interest of a metal film with a defined amount of heat energy includes,

delivering a pulse of infrared energy to the region of interest.

3. The method of claim 1, wherein the method operation of measuring a temperature of the thin film includes,

detecting an infrared signal indicating a temperature associated with a location along a layer of the metal film; and

calculating a heat transfer rate from the region of interest to the location.

4. The method of claim 1, wherein the method operation of calculating a thickness of the metal film based upon the temperature and the defined amount of heat energy includes,

defining a calibration curve correlating the temperature with the thickness; and

selecting the thickness associated with the temperature through the calibration curve.

5. The method of claim 3, wherein the region of interest and the location are defined at different points of the metal film.

6. The method of claim 1, wherein the method operation of measuring a temperature of the thin film includes,

pausing for a time period after the heating operation prior to measuring the temperature.

7. A method for determining a thickness of a metal film barrier, comprising:

delivering a defined amount of heat energy to a region of interest of the metal film barrier;

detecting a heat transfer rate of the defined amount of heat energy along the metal film barrier; and

determining the thickness of the metal film barrier based upon the heat transfer rate.

8. The method of claim 7, wherein the method operation of delivering a defined amount of heat energy to the metal film barrier includes,

depositing a pulse of infrared energy through a substrate to the metal film barrier.

9. The method of claim 7, wherein the method operation of detecting a heat transfer rate of the defined amount of heat energy along the metal film barrier includes,

detecting an amount of the heat energy remaining at the region of interest after a delay period; and

calculating a difference between the defined amount of heat energy and the amount of the heat energy remaining.

10. The method of claim 7, wherein the method operation of detecting a heat transfer rate of the defined amount of heat energy along the metal film barrier includes,

measuring an amount of the heat energy at a location other than the region of interest; and

calculating a heat transfer rate of the heat energy from the location of interest to the location.

11. The method of claim 7, wherein the method operation of determining the thickness of the metal film barrier based upon the heat transfer rate includes,

selecting the thickness from a calibration curve associating thickness and heat transfer rates.

12. The method of claim 7, further comprising:

generating a calibration curve associating thickness of the metal film barrier to the heat transfer rate.

13. A chemical mechanical planarization (CMP) system, comprising:

a wafer carrier configured to support a wafer during a planarization process, the wafer carrier including a sensor configured to detect heat energy;

an impulse heater configured to deliver a defined heat energy pulse to a metal layer disposed on the wafer; and

a computing device in communication with the sensor, the computing device configured to calculate a thickness of the metal layer based upon the detected heat energy in relation to the defined heat energy pulse.

14. The system of claim 13, wherein the sensor is an infrared sensor.

15. The system of claim 13, wherein the heat energy is infrared heat energy.

16. The system of claim 13, wherein the sensor is positioned to detect the heat energy in a location different from where the impulse heater delivers the defined heat energy pulse to the metal layer.

17. The system of claim 13, wherein the computing device includes a storage device storing a calibration curve relating the heat energy pulse and the detected heat energy to the thickness.

18. The system of claim 13, wherein the computing device is configured to calculate a heat transfer rate from values associated with the detected energy and the defined heat energy pulse.

19. The system of claim 13, wherein the impulse heater is positioned on an opposing side of the substrate from the sensor.

20. The system of claim 19, wherein an axis of the impulse heater is different from an axis of the sensor.

21. The system of claim 19, wherein the computing device includes,

delay circuitry for delaying detection of the heat energy for a period of time after delivering the defined heat energy pulse.